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MR. EDITOR.—The experiments recorded in the following paper are a valuable addition to our knowledge of the physiological action of the bromide of potassium, and I have therefore sent them to your JOURNAL for publication. The paper was presented by its author to the Medical Faculty of Harvard College, as his graduating thesis, at the last examination for medical degrees.

Very truly yours,  
E. H. CLARKE, M.D.

BROMIDE OF POTASSIUM.

By H. P. BOWDITCH, M.D.

In this thesis I intend to consider the physiological action of bromide of potassium in the light thrown upon the subject by recent observations, particularly those of Voisin, reported in the *Bulletin de Thérapeutique* for August, 1866, those of Damourette and Pelvet in the *Bulletin de Thérapeutique* for August and September, 1867, and those of Laborde in the *Archives de Physiologie* for May and June, 1868. I shall also refer to some experiments made at the Massachusetts Medical School during the past spring by a class of students under the direction of Prof. E. H. Clarke and Dr. Robert Amory.

I shall first consider the absorption and elimination of bromide of potassium, and then speak of its action on the various organs and systems as it enters, while it remains in, and as it passes out of the body.

*Absorption of Bromide of Potassium.*

The great solubility of bromide of potassium would lead us to infer that it would be rapidly absorbed when taken into the stomach. That this is really the case is shown by the following experiment by the class. Ten grains of bromide of potassium were administered to a rabbit by the oesophagus. Six minutes afterwards, the carotid artery was opened and  $\frac{1}{3}$  iss. of blood drawn. A careful quantitative examination of this blood (by Mr. Wood) showed the

presence of gr. .055 of bromide of potassium. Assuming the weight of the animal to be six pounds, and adopting Lehmann and Weber's estimate\* that the weight of the blood =  $\frac{1}{4}$  of that of the whole body, we can calculate the amount of bromide of potassium present in the whole blood, thus :—

$$\begin{aligned} \text{Wgt. of blood drawn : wgt. of whole blood} &= .055 : x \\ \text{or } 90 : 5250 &= .055 : x \\ \text{whence } x &= 3.23 \text{ grains.} \end{aligned}$$

That is to say, about one third of the whole amount taken passed into the blood in the first six minutes. We may, therefore, conclude that the drug is rapidly absorbed.

*Elimination of Bromide of Potassium.*

The elimination of bromide of potassium takes place chiefly by the kidneys and the skin. The mucous membrane of the whole alimentary canal probably takes part in this process. Under certain circumstances, it is supposed that the air-passages, the conjunctiva and the salivary glands also eliminate the drug. These different modes of elimination will be separately considered.

*Elimination by the Kidneys.*—To determine the rapidity of elimination by the kidneys, the following experiment was tried by the class. Twenty grains of bromide of potassium were taken by the stomach, and the urine collected at the following periods after the administration :—10 minutes, 30 minutes, 1, 2, 4, 6, 8, 13, 16, 18, 25, 32 and 42 hours. Each specimen of urine was evaporated to dryness, ignited with caustic soda, re-dissolved, filtered and tested for bromides by chlorine water and bisulphide of carbon. The earliest period at which the urine showed distinctly the presence of a bromide was 30 minutes, and the latest 25 hours. There was possibly a very slight trace at the end of 32 hours. In another experiment by the class, very slight traces of a bromide were found 48 and even 52 hours after taking 10 grains of bromide of potassium. Where the drug has been given continuously for a great length of time, it is found in the urine after much longer periods. For instance, in the urine of a patient who had been taking bro-

\* See Flint's Physiology, vol. i. p. 102.

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mide of potassium for epilepsy, the drug was found by Namias\* fourteen days after all treatment had ceased.

To determine the amount of bromide of potassium eliminated by the kidneys was the object of the following experiment by the class.

Five doses of 10 grains each were taken between 5 $\frac{1}{2}$ , P.M., of the 5th, and 11, P.M., of the 6th of May, and the urine collected for 32 hours ending on the morning of the 7th. A quantitative examination of this urine (by Mr. Ware) showed the presence of 28.72 grs. of bromide of potassium, i. e. rather more than one half of the whole amount taken. In another experiment by the class, 30 ounces of urine were collected during the second 24 hours after taking 10 grains of bromide of potassium. In this a small amount of the drug was discovered (not far from 3.8 grs.).

As in the former of these two experiments, no urine was collected later than 8 hours after the last dose was taken, and as the latter shows that elimination continues actively during the second day, we may conclude, I think, that the kidneys eliminate by far the largest part of the drug. The amount thus excreted, however, is not always in proportion to the amount swallowed, as has been shown by Voisin.<sup>†</sup> It is, therefore, probable that external circumstances greatly modify the relative activity of the eliminating organs, or that a portion of the drug is sometimes decomposed in the system. From the fact that the odor of free bromine has been noticed in the breath after taking bromide of potassium, it is evident that the latter occurrence occasionally takes place.

*Elimination by the Skin.*—That the skin may act as an eliminating organ for bromide of potassium, is shown by the following experiment by the class. Two doses of 10 grains each were taken 3 hours apart. The experimenter then entered a Turkish bath, and collected 3ivss. of perspiration by means of a clean sponge. This was examined quantitatively (by Mr. Wood), and found to contain .4 gr. of bromide of potassium. Of course, under ordinary circumstances, the skin does not eliminate so actively as this; but when we consider how large is the amount of insensible perspiration, I think we may conclude that an appreciable quantity of the drug finds its way out of the body by this route. This conclusion was reached by Voisin,<sup>‡</sup> judging

from the eruption of acne and other cutaneous affections which he had noticed as following the use of the drug.

*Elimination by the Alimentary Canal.*—From the marked effect produced on the mucous membrane of the mouth and pharynx by bromide of potassium, it is very probable that a considerable portion of the drug passes out by this surface, but as the secretion is always swallowed with the saliva, nothing is really eliminated from the system.

From the effect of the drug on the intestinal secretion, it is probable that a portion passes out with the feces, but I am not aware that this has ever been proved experimentally.

*Elimination by the Saliva.*—Voisin,\* in his experiments on the elimination of bromide of potassium, sometimes found the drug in the saliva, and at other times failed to find any trace of it. Our own experiments had the same unsatisfactory result. In one by the class, 8 grains of bromide of potassium were taken, and five minutes afterwards 3ij. of saliva were collected, the mouth having been carefully washed out. This saliva, examined in the usual way, showed the presence of a bromide in a considerable amount. Three hours afterwards, the saliva contained a bromide in slight amount. In other experiments, the saliva, examined shortly after taking bromide of potassium, showed little or no trace of a bromide. In these experiments, and apparently in those of Voisin also, the saliva examined was the mixed secretion, containing, of course, mucus from the mouth and pharynx. No experiments, as far as I know, have been undertaken to prove the elimination of bromide of potassium by the salivary glands. But, whether derived from these glands, or from the mucous membrane, the drug passes back into the system, and there is therefore no real elimination.

*Elimination by other Mucous Membranes.*—From the coryza, epiphora and bronchial catarrh occasionally observed to follow the giving of bromide of potassium, Voisin<sup>†</sup> has concluded that the Schneiderian membrane, the lachrymal organs and the bronchial mucous membrane may sometimes act as eliminating organs.

*Elimination by the Breath.*—Voisin<sup>‡</sup> has noticed the odor of bromine in the breath, even as long as eight days after the giving of bromide of potassium. This, of course, implies a decomposition of the bromide,

\* Gazette Hebdomadaire, April 24th, 1868.

† Bulletin de Therapeutique, vol. lxxi. p. 106.

‡ Ibid, p. 107.

\* Bul. de Th., v. lxxi. p. 106.

† Ibid, p. 107.

‡ Ibid, p. 106.

and probably accounts in some measure for the variable results obtained by this observer in his quantitative examinations of the urine. In one of the experiments by the class, the breath was passed through bisulphide of carbon for fifteen minutes, but gave no evidence of containing free bromine.

It will be noticed that in all our experiments the presence of a *bromide*, and not of *bromide of potassium*, was determined; but, as the bromine cannot meet in the body with a stronger base than that with which it is already combined, there is no doubt that it passes out of the system as bromide of potassium. Moreover, Voisin has obtained from the urine the pure salt in cubical crystals.

Let us now consider the physiological action of bromide of potassium as it passes into the body. This consists simply in its local effect on the absorbing surfaces with which it is brought in contact. The direct effect of the drug on the tissues may be studied by placing a small portion of the salt on the mesentery of a frog or the tail of a tadpole, and observing the part under a microscope. As the salt begins to be dissolved, the first effect is a contraction of the bloodvessels in the neighborhood and a diminution in the circulation of the part. This is followed, after a short time, by a dilatation of the vessels and a hyperæmia of the part. These appearances are most readily to be seen in the mesentery, where the arteries near which the salt is placed show very clearly a primary constriction and a secondary dilatation.

This action of bromide of potassium on the circulation resembles simple irritation, as described by Paget,\* and in its action on the alimentary canal we find still further points of resemblance. On the ingestion of bromide of potassium in moderate doses, no local effects are perceived, but large doses produce a sensation of smarting in the fauces; and very large ones (100 to 150 grs.) a feeling of heat in the epigastrium and sometimes of nausea.† This irritant action may be carried far enough to produce actual lesions, such as are found in the stomachs of animals poisoned by bromide of potassium: viz., corrosion of the mucous membrane, with infiltration of blood, and detachment of the epithelial coat.‡ The irritant power of the bromide is also shown by the pain which it

causes when administered to animals by subcutaneous injection. When given in this way, another local action is to be observed: viz., a trembling of the muscles near the point of injection, which is evidently due to the contact of the bromide with the muscular tissue.

We will next consider the effects of the bromide after it has passed into the system. As the drug is carried to every part of the body by means of the blood, we are naturally led to consider first the effect on the circulatory system.

Damourette and Pelvet\* observed the web of a frog's foot when the animal was under the influence of bromide of potassium, and found that in the case of moderate doses the capillary circulation was always diminished, and that this diminution preceded in all cases any weakening of the heart's action, as indicated by the number of its pulsations. (This primary effect of diminishing the circulation deserves attention, for, as we shall see hereafter, the action of the drug on many organs can be explained on the supposition of a vascular sedation in the parts affected.) The diminution of the circulation was most marked in the immediate neighborhood of the point injected, but extended more or less over the whole capillary system. In two cases,† where very large doses were given, and in one where the limbs of the animal were sprinkled with bromide, they noticed a capillary congestion which they explained on the supposition that the action of the drug had been powerful enough to paralyze the muscular coat of the vessels by exhausting its irritability. This corresponds with the phenomena which I have already described as occurring in the mesentery of a frog when bromide of potassium is applied locally. It therefore seems possible that the drug, when introduced into the system, may act on the vessels by direct contact with their walls; but, from the suddenness with which the capillary circulation has been seen to resume its activity on the cessation of the anesthetic sleep, we may reasonably suppose that it also acts on the circulation through the vaso-motor nerves.

#### Action on the Heart.

Damourette and Pelvet‡ found, in their experiments on frogs, that the pulsations of the heart were diminished in frequency under the influence of bromide of potassium, being sometimes reduced as low as eight in a minute. Since this sedation of

\* Surgical Pathology, p. 214.

† Voisin, Bul. de Thér., v. lxxi, p. 98.

‡ Eulenbergh and Guttmann, Gaz. Heb., July 5, 1867; and experiment by the class.

\* Bul. de Thér., vol. lxxiii, pp. 249 and 293.

† Ibid, p. 251. ‡ Ibid, p. 292.

the heart's action follows that of the capillary circulation and ceases when the latter is restored to activity, it seems reasonable to suppose that the rapidity of the heart's action is diminished in consequence of the mechanical obstacle presented by the contracted capillaries. This rapid change, however, in the movements of the heart on the cessation of the anaesthesia, led Damourette and Pelvet to infer that bromide of potassium acted on the heart through the nervous centres which govern it; but, as they had also demonstrated that this drug may act directly on the heart as on any other muscle to destroy its irritability, they concluded that the heart was subjected to a double action of the drug—on its nerves and on its muscular substance. Whatever may be the mode of action of bromide of potassium on the heart, this organ is the last to lose its vitality when poisonous doses have been given. It continues to beat long after all other signs of life have departed. This has been noticed by Damourette and Pelvet, and by Laborde, and in the experiments by the class the heart of a frog poisoned by bromide of potassium has been seen to beat three hours after the death of all the other parts; and at the autopsy of a guinea-pig killed in the same way, the heart was found still to retain its irritability. Eulenburg and Guttmann,\* on the other hand, assert that the primary action of the bromide is to paralyze the heart. Damourette and Pelvet consider that this mistake may have arisen from examining the heart some hours after it had ceased to beat, and when the walls had become relaxed. They have, it is true, observed rare instances in which the heart has ceased to beat while the nerves and muscles still retained their life; but they explain them by supposing that the injection may have been made so near the heart as to affect that organ by direct imbibition, or that the point of the injecting syringe may have entered a vein, and thus an amount of the drug sufficient to occasion paralysis may have been thrown directly into the heart.

It should be mentioned here that Voisin,† in his clinical observation on bromide of potassium, states that the pulse always retains its force, rhythm and frequency. As many of Voisin's patients received from 5 to 10 grammes (77 to 154 grains) of bromide of potassium a day, I think we may conclude that, though a sedation of the *capillary circulation* is one of the primary effects of bromide of potassium, it is im-

probable that we can by legitimate doses produce any *direct* effect on the action of the heart.

#### *Action on the Muscles.*

Damourette and Pelvet\* have demonstrated that muscular irritability may be entirely destroyed by the direct contact of bromide of potassium; yet as most experimenters agree that the muscular system is the last to be affected by the drug, it is probable that the sensation of muscular fatigue and the staggering gait noticed by Voisin† in patients under the influence of bromide of potassium were produced through the agency of the nervous system. The same is undoubtedly true of the tetanic convulsions which Laborde‡ observed in frogs when poisoned with 25 grammes of bromide of potassium. Since in all cases of poisoning by bromide of potassium muscular contractility remains unimpaired to the last, we may conclude, I think, that in therapeutical doses the drug exerts no appreciable effect on muscular contractility. But though muscular *contractility* may remain unimpaired, muscular *movements*, being affected through the nervous system, are undoubtedly enfeebled. In fact, it is the weakening and final annihilation of the respiratory movements which seem to be the direct cause of death in animals poisoned by bromide of potassium.

#### *Action on the Nervous System.*

Here we find great difference of opinion amongst observers. Damourette and Pelvet§ maintain that bromide of potassium has no elective action at all, that it is, in fact, a "general nervo-muscular poison," but that in its action on the nervous system the different parts are affected in the following order, viz., sensitive nerves, motor nerves, brain, spinal cord. Laborde,|| on the other hand, asserts that "bromide of potassium exercises a predominant and to a certain degree an *elective action on the nervous system* in general, and especially on the phenomena of *reflex action*, implicating at the same time the central organ concerned in these movements and the sensitive peripheral nervous expansions. The action of the drug extends *secondarily* to the organs of spontaneous movement (the brain and motor nerves), and this contrast between these two orders of phenomena is one of the characteristics of the physiological influence of the bromide."

\* Gaz. Hebdom., July 5th, 1867.  
† Bul. de Thér., vol. lxxxi. p. 104.

• Bul. de Thér., vol. lxxiii. p. 290.  
† Ibid, vol. lxxxi. p. 103.  
§ Bul. de Thér., v. lxxiii. p. 300.  
|| Arch. de Phys., No. 3, p. 442.

To discuss the various experiments which led these observers to such opposite conclusions, would carry me beyond the limits appropriate for a thesis. It will be sufficient to mention the points of difference in their modes of experimenting as the probable causes of their widely different results. In the first place, Damourette and Pelvet never used larger doses than '05 to '10 grammes. These always proved fatal to frogs. M. Laborde, however, did not consider that the physiological action of the drug was fully developed except in doses of from '20 to '30 grammes. Moreover, Damourette and Pelvet did not destroy the connection between the brain and spinal cord of the animals on which they experimented; a process which Laborde\* considers absolutely essential for the proper appreciation of reflex phenomena. Damourette and Pelvet† seem sometimes to have confounded the sensibility of the cord to direct irritation with its power to produce a reflex action, which, of course, are two totally different functions. One of Voisin's observations tends to support the views of Laborde rather than those of Damourette and Pelvet. This observer‡ states that even under the influence of strong doses of bromide of potassium, patients feel the slightest touch on the palate or pharynx, and that the movements of these parts are perfectly retained, while the reflex sensibility is diminished or entirely destroyed, so that tickling no longer produces nausea.

Eulenburg and Guttmann have arrived at conclusions differing both from those of Laborde and from those of Damourette and Pelvet; but as I have not at hand a detailed account of their experiments, I have not thought it worth while to consider their views. However much observers may differ with regard to the succession in which the different parts of the nervous system are affected, they all agree that bromide of potassium acts as a nervous sedative. The question then arises, how is this sedation produced? Is it a direct effect of the drug on the nervous substance, or a secondary effect resulting from a diminished capillary circulation in the nerves and nervous centres? That bromide of potassium will act directly on a nerve with paralyzing effect has been proved, by Damourette and Pelvet,§ by isolating a nerve and applying the drug in a portion of its course. The nerve loses its irritability in the portion thus treated, but retains it above and below. On the

other hand, the efficacy of bromide of potassium in epilepsy is an argument in favor of its action being through the circulation, since this disease is generally considered to be connected with a hyperæmia of the nervous centres, and especially of the medulla oblongata.\* Moreover, those nervous sedatives, such as opium and chloroform, which do not influence the circulation, are not found to be particularly useful in the treatment of epilepsy. We cannot, however, suppose that the nervous sedation is due entirely to the arrest of the circulation, since the nerves of a limb retain their properties for several hours after the suspension of the circulation by ligature of the arteries.† It is, therefore, probable that bromide of potassium acts on the nervous system both directly and through the medium of the circulation.

The effects on the cerebral functions, as noticed by Voisin,‡ are (in doses of six grammes and upwards), diminution of the clearness of the mind, weakness of memory and reflection, a general torpor, difficulty in collecting the ideas, in reasoning, in recollecting questions even for a moment, and consequently in writing or speaking. Sometimes the speech is drawling, the language very incorrect, and the words incoherent and meaningless. The disposition sometimes becomes irascible, but is generally apathetic. The hypnotic effect of the drug is sometimes excessive, the disposition to sleep being quite irresistible. Voisin has not observed any change in the sensibility to pain or touch, or in the sensation of temperature.

Sight has been noticed in several cases to be troubled and confused, without any lesion appreciable by the ophthalmoscope. Injection of the conjunctiva, chemosis, and dilatation of the pupils have also been observed. Pain and ringing in the ears, partial deafness and obstruction of the Eustachian tubes, have been noticed by Voisin.§ (Some of these symptoms are no doubt due to the elimination of the drug by the mucous membranes of the eye and ear.) In contrast to the usual sedative effect of bromide of potassium, cerebral excitement, amounting almost to delirium, has been observed by Voisin.|| Similar phenomena, though less in degree, have been observed by Dr. W. O. Johnson, of Boston, and reported in the Boston Medical and Surgical Journal for Jan. 16th, 1868. A case has also fallen under my own observation where

\* Arch. de Phys., No. 3, p. 437.

† Bul. de Thér., vol. lxxiii. pp. 247, 248.

‡ Ibid, vol. lxxi. p. 100.

§ Ibid, vol. lxxiii. 290.

\* See Bul. de Thér., v. lxxiii. p. 242.

† Ibid, p. 294.

‡ Ibid, vol. lxxi. p. 102.

§ Ibid, pp. 103 and 110.

|| Ibid, p. 105.

the medicine seemed to produce sleeplessness and nervous excitement. These cases are so entirely exceptional that for the present they must be classed rather unsatisfactorily as individual idiosyncrasies.

#### *Action on Temperature.*

From the vascular sedation produced by bromide of potassium, we naturally expect a diminution of animal heat, and this is stated by Damourette and Pelvret\* to be a constant result. On the contrary, Voisin, in his clinical observations, has noticed no change in the temperature. It is probable, therefore, that it is only with poisonous doses that any notable diminution of the animal heat takes place.

#### *Action on the Genital Organs.*

All clinical observers have noticed the antaphrodisiac power of bromide of potassium, which is undoubtedly dependent upon its effect upon the circulation. (In fact, it has been observed† that this vaso-motor power is the only one which is common to all the most efficient antaphrodisiacs.) Voisin,‡ however, has noticed two cases where the drug seemed to produce a genital excitement amounting almost to satyriasis. Diminution of the menstrual discharge has been noticed in patients under the influence of bromide of potassium.§ This naturally follows from its effect on the circulation of the part.

We have thus seen that the effects of bromide of potassium while in the system are entirely consistent with the supposition of a vascular sedation of the parts affected, and no doubt depend in a great measure on this sedation, though the drug probably acts to some extent directly on the nerves and muscles. It is possible that in those exceptional cases of nervous and genital excitement which are on record, the drug may have, for some reason or other, produced its secondary effect of hyperæmia of the part.

It remains now to speak of the action of bromide of potassium as it passes out of the body. This includes a consideration of its effect on all the secretory organs by which it is eliminated : viz., the kidneys, the skin, and the mucous membranes generally.

#### *Action on the Urinary Organs.*

The diuretic effect of bromide of potassium has been often noticed. Voisin|| considers it a result of large doses only, hav-

ing rarely observed it except with doses of 3-4 grammes (46-61 grains) and upwards. In one patient, who took 10 grammes (154 grains) a day, diuresis only occurred after the treatment had been kept up for 6 weeks. In our own experiments, however, this effect seemed to be produced more readily. In one case, after taking 30 grains of bromide of potassium, 68 ounces of urine were secreted in 24 hours ; although on the same day a turkish bath was taken and a considerable portion of the drug was doubtless eliminated by the sweat. The average daily amount of urine excreted by the same individual, as determined from observations on seven successive days, was 44 ounces. The question arises, what is the cause of this diuresis ? Damourette and Pelvret\* attribute it in part to the increase of arterial tension resulting from the constriction of the capillaries. But this constriction must produce, to a certain extent, anaemia of the kidney, and in any secreting organ, other things being equal, anaemia is followed by a diminished secretion. Moreover, if constriction of the capillaries produces hypersecretion in the kidneys, why is this hypersecretion the secondary rather than the primary result in all the other secreting organs ? Is it not more reasonable to suppose that where diuresis is produced there is a hyperæmia of the kidney, and that the reason of this hyperæmia is that the drug, being eliminated by the kidney more extensively than by any other organ, produces here more promptly than elsewhere its secondary effect of an increased circulation ? The fact that the urine is sometimes bloody is an argument in favor of this view, for hemorrhage would not be likely to take place from an anaemic kidney. Since in many cases diuresis is not noticed unless the drug has been given in large doses, or for a long time, it is clear that this is not one of the primary effects of the drug, and it is quite possible that in these cases a careful examination might have shown primarily a diminution in the amount of urine.

Retention of urine† has been noticed both in man and animals under the influence of bromide of potassium. If this be due to the destruction of the reflex sensibility of the bladder, which is not improbable, it is an argument in favor of the views of Laborde.

#### *Action on the Skin.*

A decided paleness of the skin‡ has often been noticed as a result of the administra-

\* Bul. Thér., vol. lxxiii. p. 295.

† Ibid. p. 101.

‡ Ibid., vol. lxxi. p. 101.

§ Ibid., vol. lxxiii. p. 298.

|| Ibid., vol. lxxi. p. 101.

\* Bul. de Thér., vol. lxxiii. p. 296.

† Ibid.

‡ Ibid. p. 297.

tion of bromide of potassium. This is evidently due to the vascular sedation of the part. The perspiration is probably at this time diminished; but where the drug is used continuously diaphoresis is apt to occur. An erythematous condition, and even a bronzing of the skin have been noticed among the later effects of the drug. The eruption of acne, which is considered by Voisin\* as a constant result of the use of bromide of potassium even in small doses, is regarded by other observers† as a very exceptional phenomenon, and as indicating an excessive elimination of the bromide by the skin. As Voisin had a very large field for clinical observation, it is probable that acne is, at any rate, a frequent result of the use of bromide of potassium. (With the fact that bromide of potassium often produces acne, and at the same time acts as an antaphrodisiac, it is interesting to compare the observation of Hillier,‡ that there appears to be little doubt that married life promotes the cure of acne, whilst continence rather favors the disease.)

#### *Action on the Alimentary Canal.*

Some observers, M. Gubler, for example, have noticed a paleness and a diminution of the secretion of the bucco-pharyngeal mucous membrane; while others, and amongst them M. Voisin, have observed hyperæmia and hypersecretion of the same surface. This discrepancy§ is no doubt to be accounted for by a difference in the doses; small amounts, by constricting the blood-vessels, producing the former; larger ones, by paralyzing the vascular walls, producing the latter effect. A difference in the weather may contribute to this result. A low temperature, by diminishing the function of the skin, increases that of the mucous membranes. A catarrh of the mucous membranes has accordingly been most frequently noticed in winter; a dryness of the same surfaces in summer. The diminution of reflex sensibility, with the preservation of the ordinary sensibility of the fauces, has already been noticed. (p. 181.)

The stomach generally remains unaffected and the appetite good. In a case, however, of poisoning by bromide of potassium,|| a woman, who was in the habit of taking 16 grammes (248 grains) of the drug daily, complained of habitual gastralgia and loss of appetite.

Constipation is a frequent phenomenon,

indicating a diminution of the intestinal secretion, and, according to Damourette and Pelvet,\* diminished sensibility and contractility of the muscular layer of the intestines. A temporary diarrhoea† has been occasionally noticed.

#### *Action on the Air-passages.*

Symptoms of a diminished secretion of the air-passages, e. g., hoarseness, aphonia, dry cough, rough voice and pain in the larynx, have frequently been noticed by Voisin.‡ He reports one case, however, of a feeble and cachectic individual who experienced a severe catarrh of the bronchial tubes.

Salivation, coryza and lachrymation have been noticed by Voisin.

We have thus seen that, in its action on the secreting organs, bromide of potassium first produces a diminution of the secretion; but when given in large doses, or for a long time, or when for any reason an organ eliminates an excessive amount of the drug, hypersecretion is the result. In the case of the kidneys, however, a primary diminution of the secretion has not been observed, probably because the drug is eliminated so largely by that organ.

It will be noticed that while bromide of potassium remains in the system it acts as a sedative to all the organs with which it comes in contact, but that when passing out of the system an increase of function of the eliminating organs is extremely common. This has been explained§ on the ground that while merely passing through an organ the drug never is present in sufficient amount to produce more than its primary effect of diminished circulation; but at the points where it passes out of the system it is, as it were, heaped up in sufficient quantity to produce its secondary effect of hyperæmia of the organ.

#### *CONCLUSIONS.*

From these experiments and observations, I think we may draw the following conclusions:—

1st. Bromide of potassium is rapidly absorbed.

2d. Though it appears quickly in the urine, it is, upon the whole, not very rapidly eliminated.

3d. It is eliminated unchanged by the kidneys, the skin, and, perhaps, by the intestines.

4th. It is sometimes decomposed in the

\* Bul. de Thér., vol. lxxi. p. 103.

† Diseases of the Skin, p. 183.

‡ Ibid.

§ Bul. de Thér., vol. lxxii. p. 294.

|| Gaz. Hebdom., April 24th, 1868.

\* Bul. de Thér., vol. lxxiii. p. 297.

† Ibid., vol. lxxi. p. 101.

‡ Ibid.

§ By Damourette and Pelvet.

system and free bromine eliminated by the breath.

5th. While passing into the system it acts as a local irritant on the surfaces through which it passes.

6th. While in the system it acts as a vascular and nervous sedative.

7th. While passing out of the system its primary effect is to diminish all the secretions, except perhaps the urine, but secondarily hypersecretion may be induced.

## Reports of Medical Societies.

SPRINGFIELD SOCIETY FOR MEDICAL IMPROVEMENT. M. CALKINS, M.D., SECRETARY.

MARCH 16th, 1868.—Dr. Buck related a case of *Nasal Catarrh*; discharge profuse and offensive. On using the nasal douche, a vest button was expelled from the nares, supposed to have been there for several years. Within two weeks the discharge had entirely ceased.

Dr. Calkins reported the case of a gentleman, aged 35, who was of scrofulous tendency and had formerly suffered from caries of the femur. The last two or three years he had had catarrh, with a tendency to bronchial affections. During the past year the nasal discharge had become very offensive. He became a patient of Dr. C. three months since, and was treated by nasal douches of carbolic acid and chlorate of potash alternately, with iron and generous diet. From time to time the nasal passages were examined, and the bones found to be denuded of periosteum. The inferior turbinate bone being loose, was removed with some difficulty, and afterward part of the superior turbinate bone. The catarrhal symptoms immediately ceased, and there has been no return.

Dr. S. F. Pomeroy reported a case of *Sub-aponeurotic Cephalematoma*. At first it was a large fluctuating tumor, extending to the lambdoidal suture posteriorly and covering a large part of the parietal bone. It was treated by evaporating lotions, and after three or four weeks disappeared.

Dr. Calkins mentioned three or four similar cases which had come under his observation, all but one disappearing under the use of lotions. In the exceptional case pus formed and was discharged by an incision.

APRIL 27th, 1868.—Dr. H. R. Vaille reported a case of *Puerperal Nymphomania*. The patient was 22 years old; second con-

finement; breech presentation; had been in labor 36 hours when Dr. V. was called. Instrumental delivery was effected successfully. She was comfortable for two days, but on the third she was pale and excited, and the nurse stated that she had been rubbing the genitals, using obscene language, and making violent gesticulations. These symptoms continued till her death, on the fourth day.

Dr. Vaille also reported a case of *Adherent Placenta*, with rupture of the membranes 65 hours before delivery. Profuse haemorrhage followed delivery, and on passing the hand into the uterus the placenta was found adherent to the fundus. As soon as this was detached the uterus contracted vigorously, and no untoward result followed.

Dr. S. F. Pomeroy reported a case of *Ossification of the Sutures of the Skull*, preventing normal delivery. The mother was a vigorous, healthy woman. Two hours after being called, he became satisfied, from examinations, that the case would demand instrumental interference. After consultation, the puncture of the head was resolved upon. The crown of the skull was removed, and the instruments applied to the base of the skull. By these means delivery was effected. The child was otherwise normal in its development, and weighed 12 pounds. The mother rapidly recovered.

A case of *Masturbation*, successfully treated by tying the spermatic arteries, was also reported.

The patient, unmarried, aged 35, had been addicted to the vice from boyhood; had nocturnal emissions, and was very melancholy. Little medicine was given, but marriage advised. For six months he was better, but afterwards became worse, and meditated suicide. Tying the spermatic arteries was decided on, and one was tied first; after which, for one month, he had no emissions. A month subsequent, the other artery was tied, and for six months after he had no emissions nor carnal desire. This desire gradually returned, and entire recovery was effected.

MAY 11th, 1868.—Dr. R. L. Buck reported a case of *Obstruction of a Bronchus by a Water-melon Seed*. The seed remained for nine weeks in the bronchus, producing much irritation, and all treatment failed to dislodge it until the feet were held up and the head down, and sharp percussion of the chest resorted to. After several trials of this expedient the seed was removed.

Dr. Pomeroy reported the discovery at

an autopsy of a portion of a nail in the lower part of the lung, that had been there for two years, causing great irritation.

Dr. Vaille reported a case in which a thimble remained lodged in the posterior nares for two years. He removed it by passing the finger through the mouth into the posterior nares. It was very much corroded.

Dr. Gardner said he had seen at an autopsy a rye-head in the air-passages that had been inhaled twelve years previous.

Dr. Calkins reported a case that came under his care, of a workman in the Armory, who, while ascending the lower portion of a stairway, suddenly slipped backward upon an upright iron rod, perforated at the upper end with an eye through which cotton waste was drawn. The rod was of the diameter of a gun barrel, and was used as a swab with which to clean the inside of the barrel. The rod entered the body just behind and a little to the left of the anus, passed behind the bowel and along the posterior wall of the pelvic cavity, upward above the brim, pressing upon the tissues, and almost coming through the skin about an inch to the left of the spine and between the last false rib and the transverse process below. It was smeared with emery and oil. The rod was withdrawn, with the assistance of two workmen, who stated that it required considerable force. The rectum was afterwards examined and found to be intact, and was accordingly unloaded by an enema. A counter-opening was made near the spine, and the track of the rod washed out carefully by injecting water through the wound. Considerable cotton waste, emery and oil, from the rod, were thus removed. In five or six weeks the patient recovered, and returned to his occupation.

MAY 25th, 1868.—The subject for discussion was the hypodermic use of morphia.

Dr. R. L. Buck said he had used morphia in this way in his own case for severe neuralgic pain in the instep. Following and remaining for three weeks after the use of the syringe there was a small hard swelling, about as large as a walnut. He had been accustomed to use this method frequently, and had seen no alarming results follow.

Dr. Pomeroy had seen alarming syncope follow the injection of one-eighth of a grain, and thought the greatest caution should be observed. The patient was an anemic and sensitive woman, and the phenomena were almost instantaneously developed. Dr. P. had used this method in some fifty instances,

but always had observed great caution, and felt fearful in using it.

Dr. Gardner had never seen any bad result, having used it in some twenty instances, but suggested that the method of Stellwag should be observed, viz., making the injection slowly, and watching the effect; and the needle should remain in the tissues for a while, that a portion of the liquid, in case of the occurrence of alarming symptoms, might be withdrawn before its diffusion in the tissues.

Dr. Calkins had used it in more than a hundred instances, always, however, with the greatest caution. He had seen no bad result except once, when the symptoms of poisoning by opium were suddenly developed from the injection of one quarter of a grain of morphia, and the case required antitodal treatment for several hours. In one case its peculiar efficacy was remarkably exhibited. A lady, pregnant at the fourth month, had for a week previous vomited every article of food and medicine. Morphia in solution per rectum, bismuth, oxalate of cerium, nux vomica, external applications, &c., had failed to relieve the symptoms in the least degree. Apprehending that the difficulty arose from hyperesthesia, more than from any gastric derangement, one quarter of a grain of the acetate of morphia was injected under the skin of the arm, and in ten minutes the nausea and faintness had ceased, and in one hour the patient ate with a relish. From this time she had but little nausea during her pregnancy, and took no medicine.

Dr. Gardner reported the successful destruction of a *Nasal Polypus* by the injection of persulphate of iron into its tissues. Dr. Buck reported the success of a similar treatment for obliterating varicose veins, but alluded to the danger of the formation of thromboses.

JUNE 8th.—Dr. W. W. Gardner reported a case of *defective vision and attendant paralysis*. The patient, a boy 15 years of age, had for two weeks previous been under treatment for fever. When Dr. G. saw the patient, the tongue was loaded, pulse about 100, and vision almost entirely gone. Both of the disks were congested. Quinine and chlorine mixture were prescribed. One week later, the pulse was 88, the tongue cleaner, and he could distinguish the hand one foot from the eye. He continued to improve for two weeks, when he could read No. 1, diamond, at five or six inches with the right eye, with the left No. 200 at twenty feet. At the third

examination, the pulse was 72. Continuation of the same treatment. After a few days he labored in the garden about an hour, after which he had an attack of severe headache, followed by paralysis of the left foot, which, however, passed away by the use of thorough friction. For three or four days he was troubled with stiffness in the limbs, which passed off in a few days. The vision in the right eye was defective; in the left it was better, but still imperfect. The case ultimately recovered. Dr. G. considered that the labor and over exertion, in his debilitated state, caused congestion of the brain and spinal cord, and the resulting paralysis.

Dr. Calkins reported a case of *partial inversion of the uterus*. Mrs. S., aged 28; first confinement; natural labor of six hours duration. The placenta was easily removed without force, and no unfavorable symptom was observed. Within fifteen minutes after delivery of the placenta, the patient complained of pain in the uterus, nausea and chilly sensations, after which the pulse became very feeble; syncope came on rapidly. Uterine haemorrhage was suspected, the hypogastric region examined, and the uterus found flabby; there was profuse flowing. The hand introduced into the uterus found the os open, and the lower part of the body contracted—as in hour-glass contraction—and girding around an introcent fundus from which the blood was rapidly pouring away. This partial inversion was immediately reduced, the clots removed, and a piece of ice passed up the vagina to the os uteri, which treatment gave immediate relief, arresting the haemorrhage and restoring consciousness and circulation. The patient remained comfortable for half an hour, when the same condition returned. The hand was again introduced, and the fundus pushed upward into its normal position; the clots of blood were removed, and a piece of ice as large as a hen's egg left in the uterus, which readily contracted. The patient immediately felt relieved, and the haemorrhage ceased. Ergot was then administered. An hour afterwards, the partial inversion or intumescence returned a third time, and was treated in the same manner. The patient recovered as well as parturient women in general, with no further difficulty. The introduction of ice into the uterus was followed by a very agreeable sensation to the patient, not causing any chills, but seeming to remove the faintness and collapse.

This case presents two points of interest: the occurrence of the displacement without

mechanical force, the placenta being completely and spontaneously detached; and, secondly, the recurrence of the condition after the reduction of the displacement had been effected. The patient, for several years previous to pregnancy, had suffered from chronic disease of the uterus, and was inclined to anaemia and to deficient tonicity of the muscular system.

## Hospital Reports.

### BOSTON CITY HOSPITAL.

Results of Surgical Cases whose termination has not been reported.

*Reported Vol. I., N. S., No. 19, p. 299.*

1. George O. Necrosis of radius. Dr. Thorndike. Discharged, well, five weeks after operation.

2. William D. Necrosis of tibia. Dr. Thorndike. Discharged, well, seven weeks after operation.

3. M. M. Ununited fracture. Dr. Thorndike. Discharged, well, having good union and strong leg, four months after operation.

4. H. L. H. Perinephritic abscess. Dr. Cheever. Discharged, well, one month after operation.

5. W. F. Lumbar abscess. Dr. Thorndike. Discharged, well, two weeks after entrance, and one month after opening of abscess.

6. Lumbar abscess. Dr. Thorndike. Recovered.

*No. 20, p. 315.*

7. M. R. Amputation of forearm. Dr. Derby. Discharged, well, one month after operation.

8. R. P. Hydrocele, double. Dr. Derby. Discharged, well, July 2d.

*No. 21, p. 330.*

9. J. R. Varicose veins. Dr. Ropes. Discharged, well, five weeks after operation.

*No. 24, p. 377.*

10. J. F. D. Amputation of thigh. Dr. Ropes. Discharged, well, two months after operation. A very good stump, and no necrosis.

*No. 25, p. 394.*

11. The case of compound and depressed fracture of the cranium reported in the number of the Journal for July 23d, has steadily progressed toward recovery. The hernia of the brain subsided entirely. The power of voluntary motion, which was, for a time, interrupted, has been restored and is now nearly as perfect as before the accident.

Two months after the injury, two necrosed fragments were removed from the wound, their size corresponding to the portions of bone, depressed and wedged so tightly at the time of the accident, as to make their removal contra-indicated. From this time, the external wound has continued to heal satisfactorily, the scalp having now nearly covered the opening. Pulsation of the brain is very distinct at this point, and the edge of the bone can be plainly felt; the appearance at present resembles very nearly the anterior fontanelle in a child a month old. The intelligence of the boy is good, and he is now nearly well.

*Vol. II., N. S., No. 2, p. 24.*

12. Epithelioma of tongue; operation by ligature; reported Aug. 13, 1868. The disease recurred *in situ*, and required a second operation, the growth having extended toward the middle of the tongue, in the interval of three weeks, appearing as an indurated nodule, with a small superficial ulceration. Ligatures were passed, as in the former instance, and the mass thus enclosed and strangulated. In six days the ligatures had all separated, without much pain or constitutional disturbance, and after sixteen days the patient was discharged nearly well.

as regards the treatment of the subject, and the knowledge of the language, the pamphlet is very creditable to its author.

Dr. Warren speaks first, of "True Keloid," which occurs spontaneously anywhere; secondly, of "False Keloid," which occurs in a cicatrix, and is partly composed of this tissue; and thirdly, of an ordinary cicatrix, which may be mistaken for true keloid. He refers to three cases, illustrating these differences, and concludes that the only trustworthy means of diagnosis is the microscope; which shows true keloid to be composed of connective tissue fibres, which are very closely arranged in bundles parallel to each other and to the long axis of the tumor; whereas in false keloid, in addition to the above are seen bundles of fibres not arranged in a parallel direction, but crossing each other at all angles, and constituting, in fact, an ordinary cicatrix. The third case referred to presented under the microscope only ordinary cicatricial tissue. Keloid has an affinity for the cellular coat of the arteries, leaving the veins intact; and may, by careful examination, be often found to have thus extended far beyond its apparent limits; and in this circumstance, Dr. Warren thinks, is to be found the explanation of the frequent recurrence of the disease after extirpation.

F. C. R.

## Bibliographical Notices.

*Ueber Keloid.* Von Dr. J. COLLINS WARREN, aus Boston (Aus dem pathologisch-anatomischen Institute in Wien), &c.

*On Keloid.* By Dr. J. COLLINS WARREN, of Boston (from the Anatomico-pathological Institute at Vienna), &c.

This little pamphlet deserves a favorable notice for two reasons: first, because it is the production of a recent graduate in medicine; and secondly, because it is written in a foreign language. It reflects much credit on its author, showing, as it does, a good degree of medical research; and because it bears the marks of a very thorough acquaintance with the German language, which must have been gained by hard study and careful observation. And although we take it for granted that Dr. Warren submitted his manuscript, before publication, to the inspection of some native German; and although, in some places, English idioms translated into German appear to be used, where a native would have expressed himself differently; we must repeat that both

*Criminal Abortion; its Nature, its Evidence, and its Cure.* By HORATIO R. STORER, M.D., LL.B., and FRANKLIN FISKE HEARD. Boston: Little, Brown & Co. 1868. 8vo. Pp. 215.

DR. STORER has here collected into a permanent form his various papers on Criminal Abortion; and the more strictly legal portion of the work has been executed by Mr. Heard. The author's views, and his earnestness in advocating them, are well known by his frequent publications among us during several years past. We wish we could believe that the crime he has illustrated were declining in frequency in our community. The subject seems to have been galvanized into a new life, in England, in a discussion before the so-called "Dialectical Society," to which we alluded in a late No. of this Journal.

*Dental Materia Medica.* Compiled by JAS. W. WHITE. Philadelphia: Samuel S. White. 1868.

This book is well printed. The compiler has, however, neglected to give authorities in many cases where they should have the proper credit; and some of the writing is

very blind and not sufficiently exact. As, for instance, the description of the manner of applying the solution of gutta percha at the bottom of page 46. Again, in speaking of the application of cantharidal collodion, he says the "periodontitis is effectually relieved." He should say "often effectually relieved," for this treatment is by no means *always* sure. Many things are not noticed at all. Should a new edition ever be called for, we trust that it will be properly enlarged, carefully written, and due credit given to the originators of formulae or the introducers of new remedies. P.

*Atlas of Venereal Diseases.* By A. CULLE-RIER. Translated by F. J. Bumstead, M.D.

PART the Fourth of this noble work has been received. It is quite up to the previous ones; and the illustrations, we think, surpass them. The reader is conducted as far as the secondary complications of Bubo, Condylomata and Roseola.

## Medical and Surgical Journal.

BOSTON: THURSDAY, OCTOBER 22, 1868.

### HOW TO STUDY MEDICINE.—No. IV.

#### SURGERY.

As a proof of how directly Surgery grows out of Anatomy, we have only to instance the familiar fact that every first year's student means to become a surgeon. From dissecting to operating seems to him but a step, ignoring, as he does, the nobler part of surgery which is not operative. So intimate is the connection that it affects anatomy itself; and we are forced to divide it into Descriptive, and Regional or Surgical Anatomy. So close an affinity must not only be based on much in common, but it points to the true time and way to study surgery, by and through, and just subsequent to, anatomy. Accordingly, we hold that the best time to study surgery is prior to the study of the theory and practice of medicine, and directly after a fair knowledge of anatomy has been acquired. By our scheme of studies, then, surgery should come in the second year. For surgery deals with *external pathology*, easier to see, and easier to grasp and learn, than disease

or than the practice of medicine. It is plain to view, and tangible in results. Fractures, operations, foreign growths, all are strictly based on anatomy; and the diseases of the bloodvessels and of the joints, most intimately.

Formal and didactic lectures on surgery are needed only to describe its history and its principles. All the rest, as the practice, the pathology and the operations of surgery, are demonstrable, and can be best taught over the living, or the dead subject; or, in other words, taught clinically, or practically, in the amphitheatre, or the dissecting room. The principles of surgery are certainly most important, and underlie all practice. But they are far from being either the whole or the greater part of the instruction which the student wants. It is therefore a well-recognized fact, that a medical school without a hospital to add clinical instruction to its didactic lectures is well nigh useless to the student. He must see acute cases, fractures, tumors, operations, and not read and hear about them only, before he goes into practice.

The second year's student should therefore begin assiduously to attend the dispensaries and hospitals in their surgical departments; and embrace every opportunity for seeing and assisting in dressings, apparatus, minor surgery and operations. This he should do for months before he is fitted to learn much from the medical wards. The mere witnessing of operations will do him no harm his first year; but he had better not follow the wards until his second.

There are three accepted modes by which Clinical Surgery may be taught.

The first is the best, but it can be perfectly adapted only to small classes of students. This consists in bed-side instruction, over the surgical case itself. This mode we carry out, as far as practicable, in Hospitals, in the clinical visit made in the wards. Unfortunately but a few can see and hear perfectly; and there are also certain things which humanity and decency forbid us to say before the patient.

The next method, better adapted to large numbers, is to carry the patients, when they can bear transportation, into the lecture-room, and illustrate their cases there to the

whole class. This is an excellent way; and if it can be still further illustrated by an operation, or the exhibition of results, is rendered yet more striking.

The third mode is to lecture after a clinical visit, or after operations, on the cases seen, or operated on; illustrating by parallel cases from the Hospital records, or by morbid specimens.

We have also in dispensaries or the outpatient department of hospitals an excellent field for direct, clinical instruction, where students can see and examine for themselves.

Surgical Pathology, fortunately, can be much more easily pursued than other pathology, because the morbid specimens are taken from the living subject. For the successful study of this branch of Surgery, the microscope is invaluable.

We can hardly over-estimate the importance of Regional Anatomy in the study of Surgery. By this we map out our field of work. It is a topographical survey of the regions where surgical maladies or growths may require operative interference, and of the landmarks and guides by which we determine where we are and where to cut, when every thing is obscured by blood.

Following close after this in order is the manual part of operative surgery, as practised upon the dead body.

MR. EDITOR.—Dr. Lente's paper in the *New York Medical Journal*, which was reprinted in yours of last week, recalled to my memory a dry closet which I once saw, when quite a boy, and which, it seems to me, has not been improved upon for cheapness and simplicity. The construction of the closet is the part I refer to, for the agent used was not dry earth, but unburnt plaster-of-paris ground to a fine powder.

The closet was built as any other, but under each perforation in the seat, there was a drawer, about one foot in depth, which could be withdrawn and emptied, as often as it was filled.

A box of the powdered plaster stood in one corner, with a little scoop in it, and every one using the closet was expected to add a scoopful of the powder to the drawer. Dry loam or even ashes would probably have served the purpose as well as the plaster.

The drawers were so small (containing

only about a bushel) that they were easily lifted, and were no more unpleasant to handle, than a bushel of turnips—and were worth nearly as much to the *farmer*, who owned the closet just described.

Yours, &c. W. H. CAMPBELL.  
*Boston Highlands, Oct. 16, 1868.*

COMPLETE FORWARD DISLOCATION OF THE TIBIA AND FIBULA UPON THE FEMUR.—[We are indebted to the kindness of Prof. F. H. Hamilton for the notes of the following case, which occurred in the practice of his correspondent, Dr. Charles S. Downes, of McIndoe's Falls, Caledonia county, Vermont.—En. N. Y. M. J.]

DEAR DOCTOR: Agreeable to promise made you at Washington, I send you the memoranda of a case of Complete Forward Dislocation of the Tibia and Fibula upon the Femur, treated by myself and Dr. Levi Burton.

Oct. 16, 1861, I was summoned to Washington, Vt., in consultation with Dr. Burton, of West Topsham; arrived at 11½ o'clock, P.M. On that day A.M. the patient, Mrs. Aldrich Hayward—a robust, young married woman, aged about twenty years—had been driving a young horse attached to a wagon, having an infant in her arms. The horse became unmanageable, ran; the patient was thrown from the wagon, in one of the hind wheels of which her right leg became entangled, and was seen to make three or four revolutions with it before the horse was disengaged, when the patient was found to be disabled, and was carried to a farm house near by. The infant, that she had all the time held in her arms, was unharmed.

On examination the limb was found shortened 4½ inches.

The lower articulating surface of the femur could be felt among the muscles of the calf of the leg. A large space could be felt above the heads of the tibia and fibula, which were resting upon the front of the femur, in which space the patella was discovered lying loosely with its lower edge to the front.

Treatment.—After the clothing of the patient was changed she was laid upon a bed. A strong sheet was folded corner-wise and passed between the limbs resting on the perineum, and secured to the right head-post of the bed (standing at the foot and facing the head). The foot and ankle were bandaged. A strong towel was applied over the instep and heel, and secured under the foot, to which was attached a

clothes-line, doubled several times around the opposite foot-post of the bed. A piece of hoe-handle, about two feet long, was passed between the several loops of the clothes-line. All being ready, an assistant was directed to turn the hoe-handle as one would turn an augur, thus making extension after the manner in which a woodsaw is tightened by twisting the lines. While Dr. Burton so managed the extending apparatus as to prevent any twisting of the limb, the other surgeon manipulated the limb, and reduction was effected perfectly, without difficulty, in a very short space of time : within five minutes.

*After-treatment.*—Patient was directed to remain in bed with the limb supported in a nearly extended position, and kept perfectly at rest, with fomentations of water, as warm as the patient could comfortably bear, constantly applied to the injured knee. Diet: light, easily digestible food. Patient left in charge of Dr. Burton.

March 2d, 1862, I saw Mrs. Hayward at her home in Orange, Vt., and learned from her that about three weeks from the time the dislocation was reduced, she was removed to her home.

There was then very little lameness, although some swelling of the knee remained. She had been doing the housework for the family without assistance for several weeks.

June 8, 1863, saw Mrs. H. again. No disability remains, and the recovery seems perfect.

*Remarks.*—The patient suffered intense pain from the time of the accident until extension was made, during which, and afterward, she expressed herself as free from, or relieved from pain.—*New York Medical Journal.*

**ON CHOPART'S AMPUTATION.** By W. F. McNUTT, M.D., M.R.C.S.E., L.R.C.P.E., &c.—As a rule, the history of a case after Chopart's amputation is about as follows: A tilting downwards of the stump; a tedious, painful process of ulceration of the cicatrix; perhaps division of the tendo-achillis (which produces no good whatever); and, after months of suffering and impairment of constitution, the patient is obliged to submit to Syme's or Pirogoff's operation, or possibly to amputation above the ankle, when the patient generally soon recovers his health, and with an artificial foot the limb is restored to almost its normal functions. Every surgeon who has had any experience with Chopart's operation—with the chances of having a tedious, pain-

ful process of ulceration of the stump—perhaps the division of the tendo-achillis—probably re-amputation when the constitution is in a condition anything but favorable to a good result—must feel that his patient runs a greater risk to life than though he had been subjected to Syme's or Pirogoff's operation, or amputation above the ankle. As to the comparative usefulness of the limb after the respective operations, either with or without an artificial foot, I am quite willing to submit the question to the unfortunate individuals who have been subjected to the different amputations, to the very high authority of Drs. B. F. Palmer and E. D. Hudson, our celebrated patent limb manufacturers, and to the surgeons who have followed the history of the cases after the different operations.

In a letter that I received from my venerable and respected friend, Prof. Willard Parker, dated New York, June 23, 1868, in reply to a letter that I had written to him on the subject, he says: "In my opinion, Chopart's operation should be abandoned. I have never seen a good and useful stump the result." He also states that he has never seen any "abiding good result from the division of the tendo-achillis." He says: "Hey's operation is both practical and useful; but instead of Chopart's, I should always recommend and employ Syme's amputation."

Having stated that Chopart's amputation should be abandoned, and having cited authorities to substantiate the statement, we will next proceed to show that, considering the foot as a piece of mechanism, Chopart's operation must necessarily fail, according to the laws which govern the mechanical construction of the foot.

Take the foot as forming an arch. The os calcis is one base, the cuneiform and cuboid bones form the other, and the astragalus is the key, upon which comes the weight of the body. The tarsal ligaments prevent the arch from spreading, when the weight is upon the key. Perform Hey's amputation on the foot—viz., remove the metatarsal bones—and the anterior base of the arch is not disturbed; consequently, Hey's amputation is both a practical and successful one. But when Chopart's amputation is performed, the anterior base of the arch is removed, so that when the weight comes upon the key, the stump must necessarily tilt forwards and downwards, which brings the cicatrix in contact with the ground. At the same time the heel is tilted up—not drawn up by the contraction of the gastrocnemius muscle, as is

stated in the books. Hence the reason why the division of the tendo-achillis in no way prevents the tilting up of the heel.

Again: take the foot as a lever. The gastrocnemius is the power, applied to the os calcis, or posterior end of the lever; the ground under the anterior extremity of the lever, or foot, is the fulcrum; while the body, the weight to be raised, comes upon the line between the fulcrum and power, making a lever of the second order. Now remove all that part of the lever anterior to the weight, as is done in Chopart's amputation, and the fulcrum is directly under the weight. The lever is destroyed, and no amount of power applied to the os calcis will suffice to raise the weight. The foot no longer being a lever, it would be better to have the leg a little shorter than the other. But in the case of Chopart's amputation, it is actually longer, on account of the tilting forward and downward of the stump, and serves to increase the inconveniences of the operation. We sincerely hope that surgeons will realize the inferiority of this amputation, in comparison with the other amputations of the foot, and that it will soon be abandoned.—*Cal. Med. Gazette.*

**ARREST OF HAEMORRHAGE AFTER EXTRACTING TEETH.** By SAM. LAWRENCE, Lowell, Mass.—Almost every week we see in the newspapers or journals accounts of the death of some unfortunate person from excessive haemorrhage following the extraction of one or more teeth.

It appears to me that the loss of life from this cause, even where the hemorrhagic diathesis exists, is almost a crime on the part of the dental and medical faculty, especially the dentists, as they have the means at hand at all times for preventing these fatal results.

The public generally, we know, are ignorant of remedies in important and critical cases, but how the well-informed dentist or physician can excuse himself is a mystery. There may be cases in surgery where it would be difficult, if not impossible, to prevent fatal results, if the blood is in a poor condition (spænæmia, as it is called), that is, where there is lack of the recuperative qualities which are essential to produce healing. But in the extraction of a tooth, a clearly defined bony wall surrounds the socket in which the roots formerly rested, and in a case of haemorrhage it merely requires a plug, which will completely arrest the flow of blood, and remain until granulations throw it out.

In excessive bleeding I usually apply persulphate of iron, and if that does not effect the purpose, spread out a small piece of lint or cotton as thin as possible, then take dry plaster of Paris (as much as will go into the cavity), and place it on the cotton, and make a ball or pellet, which I force into the alveolus with a blunt instrument (after removing the coagulum), and then place the finger or thumb upon it, and press evenly from three to five minutes, or until the plaster sets and the cavity is hermetically sealed. I have invariably succeeded in checking the haemorrhage in this way.—*Dental Cosmos.*

DR. BORDER has an article on the Glycosuria, which occurs naturally during convalescence from acute diseases.

In 100 newly delivered females, 27 had a quantity of sugar in their urine, which varied from 8 to 12 grammes, or from 120 to 180 grains in each litre; 35 others had traces of the same; and 38 had none.

Sugar has also been found in the urine of some consumptive, epileptic, hysterical and strangulated persons; also in paludal fevers, carbuncle, and the reactive stage of cholera; in all these cases more sugar is formed, or less is consumed in the system than is natural, and the surplus is simply cast out. In the instance of the pregnant female, she has been making sugar for two organisms, and when one is detached from her the surplus of sugar is got rid of through the kidneys. The same occurs in many acute maladies: the consumption of sugar is stopped in the system, and the excess is evacuated with the urine.

Glycosuria is almost a normal condition in the convalescence from acute maladies.

When it is absent, a profuse critical discharge from some other organ has generally taken place.

Measles, pneumonia, erysipelas, and almost all inflammatory fevers are followed by temporary glycosuria.

This seems due to a sudden arrest of a maximum of combustion, and is the result of a difference between the destruction and production of glucose in the organism.—*Archives Générales de Médecine.*

M. LABBE, Surgeon to the Paris Salpêtrière (asylum for aged women and the insane), lately had to operate upon a woman 105 years of age for strangulated crural hernia. The wound suppurred for about a week, and the patient made a good recovery.—*London Lancet.*

## Selections and Medical Items.

**TRANSMISSION OF LIGHT THROUGH ANIMAL BODIES.**—Dr. Richardson exhibited to the British Association for the Advancement of Science a lamp which he had constructed for transmitting light through the structures of the animal body. He believed that the idea that this could be effected was given in Priestley's work on Electricity; that great chemist had observed, on passing a discharge of a Leyden battery through his finger, that the structure seemed to present luminosity—but the operation was painful. A suggestion of Dr. Macintosh, last year at Dundee, had been acted on by Dr. Richardson, who had observed the motion of the heart and of respiration by direct ocular demonstration while these organs were under the influence of various bodies belonging to the ethyl and methyl series. Dr. Richardson had so far extended the principle that he was enabled to transmit light through various tissues of the bodies of large animals. The particular details of all these interesting and elaborate experiments he described. In a child, the bones could be seen in the arm and wrist. The movements and outline of the heart could also be seen in the chest.—*Lancet.*

**ON THE MODE OF ADMINISTRATION OF PHOSPHORUS AND OF ITS EFFECTS IN SMALL DOSES.**—For internal administration, Dr. G. Dujardin Beaumetz recommends one gramme of phosphorus to be dissolved in one thousand grammes of chloroform; this solution is enclosed in gelatin capsules (perles) each of which should contain ten centigrammes of the solution. To guard against the action of light, capsules should be colored. In administering the capsules, one should be given on the first day, two on the second, three on the third, the dose being increased by one capsule daily, until some signs of derangement of the digestive organs, colicky pains, vomiting or diarrhoea, occur; the phosphorus is then intermittent, to be again resumed, after an interval of several days, on their complete subsidence, being careful always to recommence with small doses. Dr. Dujardin Beaumetz has carried the dose as high as ten capsules.

Given in small doses phosphorus produces great excitement of the nervous system, increase of muscular activity, exhilaration of the spirits, excitement of the genital organs, without causing any decided effects upon the circulation or the temperature.—*N. Y. Med. Journal.*

**WASTE OF MUSCLE DURING EXERCISE.**—Dr. Hermann communicated articles on this subject to the *Berliner Klinische Wochenschrift*, May 11, 1868, in which he attempts to explain the fact that while after moderate exercise there is no increase of nitrogen excreted, there is an increase after violent exercise. He considers that the contraction of a muscle during life is analogous to, or perhaps identical with, the post-mortem rigidity, both being caused by the coagulation of myosin, the chief nitrogenous element of muscle; and that, as after death the earlier stages of rigidity can be checked by passing arterialized blood

through the vessels, so during life the circulation acts whenever a muscle has been contracted. He shows that stiffness after death is hastened by constant irritation of the muscle; and he supposes that in the cases where, after excessive exercise, more urea is secreted than before, the muscle has been so much used that some of its fibres have become permanently contracted beyond the power of the oxygen in the blood to reinstate them in their normal condition, and consequently the coagulated myosin, and indeed the whole fibre, must be eliminated and replaced. He supposes that in ordinary contractions the myosin is partially coagulated, and then immediately brought back to a condition of fluidity by oxygen, so that the same nitrogen is used over and over again. He also supposes that the heat produced constantly in the tissues is not caused by their consumption or combining with oxygen, but by the consumption of some undetermined carboniferous substance in the circulation itself.—*Half-Yearly Compend of Med. Science.*

**DR. M. J. RESCHLAMB.** of Quincy, Ill., reports the birth, in different families, of six male children, whose average weight was 13*1/2* lbs., the largest one 17*1/2* lbs., and the smallest one 12 lbs. Dr. Ballard, of Bloomington, Ill., reports one male child of 14 lbs.

### MEDICAL DIARY OF THE WEEK.

**MONDAY, 9 A.M.**, Massachusetts General Hospital, Med Clinic, 9 A.M., City Hospital, Ophthalmic Clinic.  
**TUESDAY, 9 A.M.**, City Hospital, Medical Clinic; 10, A.M., Medical Lecture, 9 to 11, A.M., Boston Dispensary, 10-11, A.M., Massachusetts Eye and Ear Infirmary.  
**WEDNESDAY, 10 A.M.**, Massachusetts General Hospital Surgical Visit, 11 A.M., OPERATIONS.  
**FRIDAY, 9 A.M.**, City Hospital, Ophthalmic Clinic; 10, A.M., Surgical Visit; 11, A.M., OPERATIONS, 9 to 11, A.M., Boston Dispensary.  
**SATURDAY, 10, A.M.**, Massachusetts General Hospital Surgical Visit; 11, A.M., OPERATIONS.

**PAMPHLETS RECEIVED.**—Transactions of the Twenty-third Annual Meeting of the Ohio State Medical Society, held at Delaware, June 2, 3 and 4, 1868.—Proceedings of the Convention for the Organization of the Nebraska State Medical Society, held in Omaha, June 24, 1868.

**MARRIED.**—In Richmond, Me., Herbert C. Mace, M.D., of Georgetown, to Miss Louise Marion, of Richmond.—In Chelsea, Mass., Franklin Booth, M.D., of Holyoke, Mass., to Miss L. Frances Newcomb.

**DIED.**—In St. Louis, Mo., Sept. 25th, Joseph N. McDowell, M.D., the 62d year of his age.

**DEATHS IN BOSTON** for the week ending Saturday noon, October 17th, 96.—Males, 48—Females, 48.—Accident, 5—aneurism, 1—apoplexy, 3—inflammation of the bowels, 1—congestion of the brain, 2—disease of the brain, 2—inflammation of the brain, 1—bronchitis, 2—cancer, 1—cholera infantum, 2—consumption, 13—convulsions, 1—croup, 7—debility, 2—diarrhea, 1—diphtheria, 3—dropsy, 1—dysentery, 2—erysipelas, 1—exhalation, 1—scarlet fever, 1—typhoid fever, 3—hemorrhage, 2—disease of the heart, 3—insanity, 1—disease of the kidneys, 2—disease of the liver, 1—congestion of the lungs, 3—inflammation of the lungs, 9—marasmus, 6—old age, 3—paralysis, 2—premature birth, 3—puerperal disease, 1—unknown, 3.

Under 5 years of age, 39—between 5 and 20 years, 9—between 20 and 40 years, 16—between 40 and 60 years, 13—above 60 years, 19. Born in the United States, 61—Ireland, 32—other places, 3.